Section 103 Rejections

Claims 1, 4 and 6 stand rejected under 35 USC §103 as being unpatentable over Okamoto, U.S. Patent No. 4,564,897 ("Okamoto") in combination with Tan et al., U.S. Patent No. 5,838,558 ("Tan"). It is alleged that Okamoto discloses the source of AC power, the rectifier and inductor as claimed, but does not disclose the claimed dead time; however, Tan discloses a soft switching power converter with a dead time. It is argued that it would have been obvious to modify Okamoto to include the dead time of Tan, to provide more efficient switching. Applicant respectfully traverses the rejections.

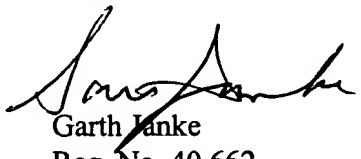
The dead time of Tan is not the same as the dead time claimed, and claim 1 has been amended to clarify the distinction.

The dead time in Tan is described at column 6, lines 44 - 47 (with reference to Figures 2A - 2F and 3): "[t]he leading leg 20, which comprises transistors Q1 and Q2, is operated at a duty cycle nominally at 50%, *with a small dead time provided in which neither transistor Q1 or Q2 is turned on* . . . ." (emphasis added). The transistors Q1 and Q2 provide the only paths available for shorting the transformer source, i.e., to short the transformer primary, one or the other must be ON. Therefore, during the dead time in Tan, the transformer source is not shorted and the impedance of the source not zero.

This is precisely the opposite of what is claimed. During the dead time claimed, the source is equivalent to a short circuit (Specification at Page 11, line 9), i.e., the impedance of the source is substantially zero. For example, where the source includes a transformer having a primary winding and a secondary winding connected to said inductor, there is a switching circuit for shorting the primary winding during the dead time.

Accordingly, Tan teaches against the claimed invention, and claims 1 - 7 cannot be obvious in light thereof. New claims 8 - 18 track existing claims. Therefore, the Examiner is respectfully requested to allow 1 - 7 along with new claims 8 - 18 and pass this case to issue.

Respectfully submitted,



Garth Janke
Reg. No. 40,662

X:\DATA\WP51\ROMPOWER\005\DOCS\AMEND7.005

MARKED UP VERSION OF AMENDMENTS

Claims 1 and 4 - 7 have been amended as shown below:

1. An AC-DC converter comprising:

a) [a low impedance] an AC source providing an alternation of a positive voltage, a negative voltage, and a dead time during which the impedance of said source is substantially zero;

b) a bridge having a first, a second, a third, and a fourth rectifier, said bridge having a first input terminal, a second input terminal, a first output terminal, and a second output terminal; wherein[,] the first rectifier is connected between the first input terminal and the first output terminal, a cathode of the first rectifier being connected to said first output terminal, wherein the second rectifier is connected between the second input terminal and the first output terminal, a cathode of the second rectifier being connected to the first output terminal, wherein the third rectifier is connected between the second input terminal and the second output terminal, a cathode of the third rectifier being connected to the second input terminal, and wherein the fourth rectifier is connected between the first input terminal and the second output terminal, a cathode of the fourth rectifier being connected to the first input terminal[,]

[(c) a capacitor connected between said first output terminal and said second output terminal]; and

([d]c) an inductor connected between said source and said first input terminal.

4. The converter of claim 1, wherein said source is adapted to cause [the] current flowing through said inductor [reaches] to reach zero before [the] voltage produced by said [voltage] source changes its polarity.

5. The converter of claim 1, wherein said source is adapted to cause [the] current flowing through said inductor [does] to not reach zero before [the] voltage produced by said [voltage] source changes its polarity.

6. The converter of claim 1, wherein [the] said [voltage] source [changes] is adapted not to change [it] its polarity until after [the] current through said inductor reaches zero and [is delayed] until [the] voltage across the rectifiers which will conduct on the next cycle reaches zero.

7. The converter of claim 1, further including a bi-directional switch connected between said first input terminal and said second input terminal, said bi-directional switch being responsive to a control voltage synchronized with said [AC voltage] source.

Please add new claims 8 - 18 as follows:

8. The converter of claim 1, wherein said source includes a transformer having a primary winding, a secondary winding connected to said inductor, and a switching circuit for shorting said primary winding during said dead time to provide said substantially zero impedance.

9. The converter of claim 2, wherein said source includes a transformer having a primary winding, a secondary winding connected to said inductor, and a switching circuit for shorting said primary winding during said dead time to provide said substantially zero impedance.

10. The converter of claim 3, wherein said source includes a transformer having a primary winding, a secondary winding connected to said inductor, and a switching circuit for shorting said primary winding during said dead time to provide said substantially zero impedance.

11. The converter of claim 4, wherein said source includes a transformer having a primary winding, a secondary winding connected to said inductor, and a switching circuit for shorting said primary winding during said dead time to provide said substantially zero impedance.

12. The converter of claim 5, wherein said source includes a transformer having a primary winding, a secondary winding connected to said inductor, and a switching circuit for shorting said primary winding during said dead time to provide said substantially zero impedance.

13. The converter of claim 6, wherein said source includes a transformer having a primary

winding, a secondary winding connected to said inductor, and a switching circuit for shorting said primary winding during said dead time to provide said substantially zero impedance.

14. The converter of claim 7, wherein said source includes a transformer having a primary winding, a secondary winding connected to said inductor, and a switching circuit for shorting said primary winding during said dead time to provide said substantially zero impedance.

15. A method for converting AC to DC, comprising providing the apparatus of claim 8 and shorting said primary winding during said dead time with said switching circuit to provide said substantially zero impedance.

16. A method for converting AC to DC, comprising providing the apparatus of claim 4 and causing said current flowing through said inductor to reach zero before said voltage changes its polarity.

17. A method for converting AC to DC, comprising providing the apparatus of claim 5 and causing said current flowing through said inductor to not reach zero before said voltage changes its polarity.

18. A method for converting AC to DC, comprising providing the apparatus of claim 6 and causing said source not to change its polarity until after said current reaches zero and until said voltage reaches zero.